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70 A200 2			MARKINGS		OMB	No. 0704-0188
OMOTWOSTLIED	16. RESTRICTIVE MARKINGS					
a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT					
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE		Approved for public release; Distribution is unlimited				
PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S) AFOSR-TR- 89-0074				
. NAME OF PERFORMING ORGANIZATION	6b. OFFICE SYMBOL	7a. NAME OF MO	NITORING ORGA	NIZATIO	NC	 .
Florida A&M University	(If applicable)	AFOSR/NC				
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Department of Physics Tallahassee, FL 32307	Building 410 Bolling AFB, DC 20332-6448					
NAME OF FUNDING / SPONSORING	8b. OFFICE SYMBOL	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER				
ORGANIZATION AFOSR	(if applicable) NC	AFOSR-86-0149				
c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS				
Building 410		PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.		WORK UNIT
Bolling AFB, DC 20332-644	8	61102F	2303		в3	100000000000000000000000000000000000000
H. W. JOnes, and C. A. Wea TYPE OF REPORT FINAL SUPPLEMENTARY NOTATION	S-1-86 TO 9-30-88	14. DATE OF REPO	RT (Year, Month,	Oay)	15. PAGE 3	COUNT
COSATI CODES	(Continue on reverse	e if necessary and	identi	ify by bloc	k number)	
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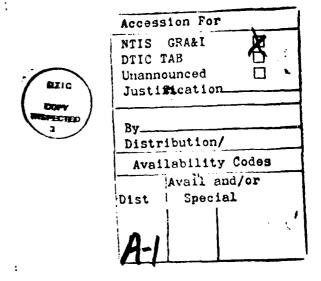
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19. Our chief concern is the production of a STO (Slater-type orbital) integral package with application to diatomic and polyatomic molecules and ions by use of the "Columbus Codes". Comparisons are to be made with GTO (Gaussian-type orbital) codes. We feel confident that the superiority of STOs over GTOs will be most pronounced for excited states and multiple moments using inverse powers of the radial distance. Our judicious use of integer arithmetic and expansions in Taylor series should bring success to the elusive goal. The outline of this new strategy is presented in a recent paper: "Analytical Evaluation of Multicenter Molecular Integrals Over Slater-Type Orbitals Using Expanded Lowdin Alpha Functions". Work on electron scattering continues to move at a rapid pace. The finite difference method has gained international recognition with Dr. Weatherford's presentation of his results at a conference in Italy and the presentation at the ICPEAC meeting in London by his collaborator, Dr. Temkin. Naturally, we hope to combine this method with STOs.

Final Technical Report
Period: May 1, 1986 - September 30, 1989
Grant No. AFOSR - 86-0149



Submitted by H.W. Jones and C.A. Weatherford Florida A&M University Tallahassee, FL 32307 Tel.: (904) 599-3470

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- 1. H.W. Jones, "Exact formulas and their evaluation for Slater-type orbital overlap integrals with large quantum numbers", Phys. Rev. A, <u>35</u>, 1923 (1987).
- 2. H.W. Jones, B. Bussery, and C.A. Weatherford, "An E-Matrix for the Löwdin Alpha-function, Expanded in a Taylor Series: An Analytic Treatment of Molecular Charge Density Near the Origin", Int. Journal of Quantum Chem. 21, 693 (1987).
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- 4. C.A. Weatherford, F.B. Brown, and A. Temkin, "Inclusion of Electron Correlation for the Target Wave Function in Low to Intermediate Energy $e-N_2$ Scattering", Phys. Rev. A, $\underline{35}$, 4561 (1987).
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